

**Virginia Electric and Power Company
North Anna Power Station
1022 Haley Drive
Mineral, Virginia 23117**

April 26, 2019

Attention: Document Control Desk
U. S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Serial No.: 19-180
NAPS: CKW
Docket Nos.: 50-339
License Nos.: NPF-7

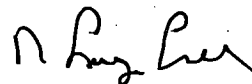
Dear Sir or Madam:

Pursuant to 10CFR50.73, Virginia Electric and Power Company hereby submits the following Licensee Event Report applicable to North Anna Power Station Unit 2.

Report No. 50-339/2019-001-00

This report has been reviewed by the Facility Safety Review Committee and will be forwarded to the Management Safety Review Committee for its review.

Sincerely,



N. Larry Lane
Site Vice President
North Anna Power Station

Enclosure

Commitments contained in this letter: None

cc: United States Nuclear Regulatory Commission
Region II
Marquis One Tower
245 Peachtree Center Ave., NE, Suite 1200
Atlanta, Georgia 30303-1257

NRC Senior Resident Inspector
North Anna Power Station

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NRR

**LICENSEE EVENT REPORT (LER)**

(See Page 2 for required number of digits/characters for each block)

(See NUREG-1022, R.3 for instruction and guidance for completing this form
<http://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1022/r3/>)

Estimated burden per response to comply with this mandatory collection request: 80 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the Information Services Branch (T-2 F43), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by e-mail to Infocollects.Resource@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NECB-10202, (3150-0104), Office of Management and Budget, Washington, DC 20503. If a means used to impose an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

1. Facility Name North Anna Power Station, Unit 2	2. Docket Number 05000 339	3. Page 1 OF 3
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4. Title Manual Reactor Trip on Degrading Condenser Vacuum due to a Failed Weld

5. Event Date			6. LER Number			7. Report Date			8. Other Facilities Involved	
Month	Day	Year	Year	Sequential Number	Rev No.	Month	Day	Year	Facility Name	Docket Number
03	02	2019	2019	001	00	04	26	2019	Facility Name	Docket Number 05000

9. Operating Mode	11. This Report is Submitted Pursuant to the Requirements of 10 CFR §: (Check all that apply)			
1	<input type="checkbox"/> 20.2201(b)	<input type="checkbox"/> 20.2203(a)(3)(i)	<input type="checkbox"/> 50.73(a)(2)(ii)(A)	<input type="checkbox"/> 50.73(a)(2)(viii)(A)
	<input type="checkbox"/> 20.2201(d)	<input type="checkbox"/> 20.2203(a)(3)(ii)	<input type="checkbox"/> 50.73(a)(2)(ii)(B)	<input type="checkbox"/> 50.73(a)(2)(viii)(B)
	<input type="checkbox"/> 20.2203(a)(1)	<input type="checkbox"/> 20.2203(a)(4)	<input type="checkbox"/> 50.73(a)(2)(iii)	<input type="checkbox"/> 50.73(a)(2)(ix)(A)
	<input type="checkbox"/> 20.2203(a)(2)(i)	<input type="checkbox"/> 50.36(c)(1)(i)(A)	<input checked="" type="checkbox"/> 50.73(a)(2)(iv)(A)	<input type="checkbox"/> 50.73(a)(2)(x)
10. Power Level	<input type="checkbox"/> 20.2203(a)(2)(ii)	<input type="checkbox"/> 50.36(c)(1)(ii)(A)	<input type="checkbox"/> 50.73(a)(2)(v)(A)	<input type="checkbox"/> 73.71(a)(4)
012	<input type="checkbox"/> 20.2203(a)(2)(iii)	<input type="checkbox"/> 50.36(c)(2)	<input type="checkbox"/> 50.73(a)(2)(v)(B)	<input type="checkbox"/> 73.71(a)(5)
	<input type="checkbox"/> 20.2203(a)(2)(iv)	<input type="checkbox"/> 50.46(a)(3)(ii)	<input type="checkbox"/> 50.73(a)(2)(v)(C)	<input type="checkbox"/> 73.77(a)(1)
	<input type="checkbox"/> 20.2203(a)(2)(v)	<input type="checkbox"/> 50.73(a)(2)(i)(A)	<input type="checkbox"/> 50.73(a)(2)(v)(D)	<input type="checkbox"/> 73.77(a)(2)(i)
	<input type="checkbox"/> 20.2203(a)(2)(vi)	<input type="checkbox"/> 50.73(a)(2)(i)(B)	<input type="checkbox"/> 50.73(a)(2)(vii)	<input type="checkbox"/> 73.77(a)(2)(ii)
	<input type="checkbox"/> 50.73(a)(2)(i)(C)	<input type="checkbox"/> Other (Specify in Abstract below or in NRC Form 366A)		

12. Licensee Contact for this LER	
Licensee Contact Don Taylor, Manager of Licensing	Telephone Number (Include Area Code) (540) 894-2100

13. Complete One Line for each Component Failure Described in this Report									
Cause	System	Component	Manufacturer	Reportable to ICES	Cause	System	Component	Manufacturer	Reportable to ICES
B	SB	PSP		Y					
14. Supplemental Report Expected					15. Expected Submission Date				
<input type="checkbox"/> Yes (If yes, complete 15. Expected Submission Date) <input checked="" type="checkbox"/> No					Month Day Year				

Abstract (Limit to 1400 spaces, i.e., approximately 14 single-spaced typewritten lines)

On March 2, 2019 North Anna Unit 2 Operations personnel were lowering reactor power in preparation for a scheduled refueling outage. Condenser vacuum began to degrade and personnel entered the Abnormal Operating Procedure for Low Condenser Vacuum. The reactor was manually tripped at approximately 12% power. The Operations crew entered the reactor trip procedure and stabilized the Unit in Mode 3 at normal operating pressure and temperature. The manual reactor trip was not complicated and shift personnel responded appropriately. After the trip, decay heat was removed by the Steam Generator Pressure Operated Relief Valves and Unit 2 was cooled down to support a scheduled refueling outage.

The direct cause of the degrading condenser vacuum was a failed socket weld downstream of a High Pressure Turbine Main Steam Supply Header Drain Valve on the condenser (steam) side.

A 4-hour report per 10CFR50.72(b)(2)(iv)(B) at 0013 hours on March 3, 2019 was made for a manual actuation of the reactor protection system.

The reactor trip is reportable per 10CFR50.73(a)(2)(iv)(A) for a manual actuation of the reactor protection system.

**LICENSEE EVENT REPORT (LER)
CONTINUATION SHEET**

(See NUREG-1022, R.3 for instruction and guidance for completing this form
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1. FACILITY NAME	2. DOCKET NUMBER	3. LER NUMBER
		YEAR SEQUENTIAL NUMBER REV NO.
North Anna Power Station, Unit 2	05000- 339	2019 - 001 - 00

NARRATIVE**1.0 DESCRIPTION OF THE EVENT**

On 03/02/19, Operations commenced a downpower of North Anna Unit 2 from approximately 90% power to shutdown conditions for a scheduled refueling outage. At 2232 on 03/02/19, operators identified Unit 2 Condenser vacuum degrading and entered the Abnormal Operating Procedure for Low Condenser Vacuum. The Reactor was manually tripped at approximately 12% power at 2237 on 03/02/19. The Operations crew entered the reactor trip procedure and stabilized the Unit in Mode 3 at normal operating pressure and temperature. The manual reactor trip was not complicated and shift personnel responded appropriately. After the trip, decay heat was removed by the Steam Generator Pressure Operated Relief Valves (PORV) (EIS System - SB, Component - PCV) and Unit 2 was cooled down to support a scheduled refueling outage.

The direct cause of the degrading condenser vacuum was a broken 1-1/2" socket weld downstream of a High Pressure (HP) Turbine Main Steam Supply Header Drain Valve (EIS - SB, Component - PSP) on the condenser (steam) side. The failure mechanism of the socket weld is high-cycle fatigue due to vibration induced stresses. A contributing cause is workmanship issues from 1998 identified in the failed weld.

The initial scope for the extent of condition determination included inspection of all eight HP Main Steam Drain Lines associated with the Unit 2 high pressure turbine. The visual inspections performed were satisfactory with no cracks or through-wall conditions noted. A second intact HP Turbine Main Steam Supply Header Drain valve line was removed and destructively analyzed for similar failure characteristics. No service induced cracking was identified. Both of the HP Main Steam Drain Lines were replaced prior to secondary plant startup activities, and all socket welds were installed using a 2 to 1 profile ratio to reduce stress concentrations and improve fatigue life. During startup, drain line vibration and temperature data were trended with no anomalies observed.

The following equipment issues occurred after the reactor trip. These issues did not complicate the reactor trip and have been entered into the corrective action program.

Immediately following the reactor trip, one Unit 2 Intermediate Range Nuclear Instrument (N-35) (EIS - IG, Component - JI) was undercompensated and did not clear below the intermediate range permissive (P-6) after the reactor trip.

Eighteen minutes following the reactor trip, one Unit 2 Source Range Nuclear Instrument (N-31) (EIS - IG, Component - JI) did not energize when Operators manually energized the source range nuclear instruments.

Approximately 3 hours following the reactor trip, Unit 2 Steam Generator "A" PORV (EIS - SB, Component - PCV) failed to operate properly in automatic. Operators placed the valve in manual and controlled parameters in accordance with station procedures.

A 4-hour report per 10CFR50.72(b)(2)(iv)(B) at 0013 hours on March 3, 2019 was made for a manual actuation of the reactor protection system.

The reactor trip is reportable per 10CFR50.73(a)(2)(iv)(A) for a manual actuation of the reactor protection system.

2.0 SIGNIFICANT SAFETY CONSEQUENCES AND IMPLICATIONS

No significant safety consequences resulted from this event. Operations personnel placed Unit 2 in a safe shutdown condition. Following the reactor trip, decay heat was removed using the Steam Generator PORVs.

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1. FACILITY NAME	2. DOCKET NUMBER	3. LER NUMBER		
North Anna Power Station, Unit 2	05000-339	YEAR 2019	SEQUENTIAL NUMBER 001	REV NO. 00

NARRATIVE**3.0 CAUSE**

The direct cause of the reactor trip was determined to be loss of condenser vacuum caused by a socket weld failure between one of the HP Turbine Main Steam Supply Header Drain Valves and the Main Condenser. The failure mechanism is high-cycle fatigue due to vibration induced stresses on the pipe.

4.0 IMMEDIATE CORRECTIVE ACTIONS

The drain line with the failed socket weld, the intact drain line removed for destructive analysis, and their associated valves were replaced using a 2 to 1 profile ratio on all the socket welds. The remaining six drain lines on Unit 2 were inspected for indications of cracks or through-wall conditions. During startup, the drain lines were monitored for temperature and vibration analysis. No anomalies were identified.

5.0 ADDITIONAL CORRECTIVE ACTIONS

Extent of Condition Inspections on the HP Main Steam Supply Header Drain Valves are planned for the next Unit 1 refueling outage.

The "A" Steam Generator PORV was repaired by work order prior to Unit startup.

The Abnormal Operating Procedures for "Malfunction of Nuclear Instrumentation" were performed for the issues associated with the intermediate range and source range instruments. Both instruments were repaired and returned to service.

6.0 ACTIONS TO PREVENT RECURRENCE

The HP Turbine Main Steam Supply Header Drain lines on both Units will be monitored to capture steady state and dynamic transient vibration and temperature profiles. The HP Turbine Main Steam Supply Header Drain piping identified as the most susceptible to high vibrations and temperature transients will be replaced if required using socket welds with a 2 to 1 profile ratio.

7.0 SIMILAR EVENTS

There are no similar events at North Anna Power Station.

8.0 MANUFACTURER/MODEL NUMBER

N/A

9.0 ADDITIONAL INFORMATION

Unit 1 continued to operate at 100% power, Mode 1, during this event.